ROLL-UP WINDOW BLIND WITH LOWERABLE GUIDE ELEMENTS

By reason of the body shape in modern motor vehicles the rear window lies relatively flat. Because of this body shape the setting sun can heat up the car interior over a relatively large light-admitting opening. This is especially disadvantageous also because underneath the rear window pane there is located the mostly dark-colored hat deposit space, which warms up strongly in the sunlight, and because of the great distance from the windowpane the sunlight can give off heat well into the car interior.

In order to prevent this, from DE 36 12 165 a roll-up window blind is known which is designed especially for mounting on the rear window. To the roll-up blind there belongs a winding shaft turnably borne underneath the hat deposit space, to which (winding shaft) there is fastened with one edge a roll-up blind. By means of a spring motor, which is seated in the tubular winding shaft, the winding shaft is pre-stressed in the direction of a reeling-in of the roll-up blind. The other edge of the roll-up blind is fastened to a pull-rod which serves as a guide rail for two swingably borne levers. The levers are swingable beside the winding shaft about an axis which is at a right angle to the axis of the winding shaft. By means of a motor drive arrangement, the two levers can be transferred from a position in which they lie about parallel to the winding shaft into an upright position. Since the free ends of the levers are connected with the pull-rod, by the

setting-upright of the levers the roll-up blind is reeled out and clamped.

The levers are, to be sure, sufficiently bending-stiff, but nevertheless by reason of their yieldingness they show in operation a vibration in a manner such that the pull-rod moves away from the windowpane or strikes against this.

In order to avoid this effect, on the ends of the pull-rod there are mounted two guide elements which, at least in the last range of the reeling-out stroke of the roll-up blind, come to lie against the inside of the rear window and in cooperation with the rear window impart a pre-stressing to the levers, so that the levers can press the pull-rod with force in the direction toward the rear window. Thereby the above-mentioned vibration effects are avoided.

The guide elements are needed in order to avoid a damaging of the heating wires on the inside of the window pane. In order to achieve this function, however, they must correspondingly overhang the outer contour of the pull-rod.

The overhanging guide elements are troublesome when the pullrod in the reeled-in state is to cover the outlet slot of the roll-up housing, or is to disappear in it. They require a corresponding enlargement of the slot opening on the outlet slot, so that in the reeling-in they can plunge through the outlet slot.

Proceeding from here it is a problem of the invention to create a roll-up window blind for windowpanes of motor vehicles in which the guide elements require no additional recesses in

3

Cont
G3 ~~the region of the outlet slot.~~

~~This problem is solved according to the invention with the roll-up window blind having the features of claim 1.~~

In the new roll-up window blind the two guide elements are no longer rigidly seated on the pullrod. They are movable with respect to the pullrod and, with the aid of a correspondingly formed bearing arrangement, they can be drawn back behind the contour of the pullrod or of a cover covering the pullrod. They have two operating positions, namely an operating position in which they are withdrawn behind the contour and a further operating position in which they project beyond the contour of the pullrod, in order to provide their supporting action on the inner side of the windowpane.

With the new solution it does not matter whether the winding shaft is borne in a separate housing or is installed directly on the under side of the hat deposit space or else is lodged in a housing that is lowered in the hat deposit space.

Depending on the form of execution then, the outlet slot can be located in the housing or in the hat deposit space.

With the new arrangement it is likewise possible to attune the pullrod and outlet slot to one another in such manner that a narrow gap remains around the pull rod, which has over its entire length virtually the same width when the pull rod in the reeled-in state is lowered in the outlet slot.

If this gap is felt to be inappropriate because small parts can jam in the gap, there is also the possibility of shaping the pullrod in such a way that with the reeled-in roll-

4

up blind it completely covers the outlet slot.

The guide or spacing elements can be slide skids or small rollers or wheels which in the traveling-out do not slide over the windowpane, but roll over it. Any damage to the heating wires is then still more surely avoided.

The bearing arrangement for the guide elements can be a slide-blocking guide, with the aid of which the guide elements are led between the two end positions. The slide-block guidance can be used both in embodiments with slide skids, and also in embodiments with rotatable rollers.

In the case of a slide skid, the slide-block guide can have the shape of a uniformly curved slot in which the slide skid is guided, secure against turning. It can, however, also take on the form of a L-shaped guide channel if a turnable roller is used. In the case of an L-shaped guide channel, this latter is aligned in such a way that one section runs about horizontally in the direction toward the rear window pane, while the other section goes downward to the next adjacent point of the horizontally running section.

Instead of the slide-block guidance, the guide elements can also be mounted on a bearing carrier which on its part is swingable about a vertical axis.

In all cases the pressing-back of the guide elements behind the contour of the pullrod occurs by the edge of the outlet slot in the reeling-in of the roll-up window blind.

The reeling-out into the overhanging position is brought about most simply with the aid of a pre-stressing arrangement

which pre-stresses the bearing arrangement or the guide element in the direction toward the overhanging position.

In addition, further developments of the invention are the object of subclaims.

In the drawing, embodiments of the object of the invention are represented as follows:

Fig. 1 a roll-up window blind mounted in a motor vehicle, in the reeled-out state, in a view from outside of the vehicle, highly schematically,

Fig. 2 the free end of the actuating lever of the roll-up window blind of Fig. 1, sliding in the pullrod,

Fig. 3 a first embodiment for the guide element of the roll-up window blind according to Fig. 1, in a side view, with omission of the other parts of the pullrod and of the roll-up window blind,

Fig. 4 the arrangement according to Fig. 3 , in the running into the outlet slot,

Fig. 5 the arrangement according to Fig. 3 in the completely reeled-in state.

Fig. 6 another embodiment of the guide elements of the roll-up window blind according to Fig. 1, in a representation similar to that according to Fig. 3,

Figs. 7 to 9 an embodiment for the guide elements of the roll-up window blind according to Fig. 1, with a swingable bearing carrier and a representation corresponding to the one in Fig. 3.

Fig. 1 shows in an extremely schematic manner the rear

6

part of a motor vehicle 1 in a view from the rear. In the perspective representation there is to be recognized a left rear side window 2 as well as a rear window 3 with the inserted, ordinarily curved windowpane 4. In front of the inner side of the windowpane 4 there is present a roll-up window blind 5, which is shown in the reeled-out state.

Further there is to be seen in Fig. 1 a hat deposit area 6, illustrated in broken-open form, in which there is contained an outlet slot 7 extending over the width of the hat deposit area 6.

To the roll-up window blind 5 there belong a winding shaft 8, two actuating levers 9 and 11, a blind material 12 as well as a pullrod 13.

The winding shaft 3, which is to be recognized section-wise in the broken-open part of the hat deposit area 6, is turnably borne underneath the hat deposit area 6 with bearing arrangements not further shown. In the interior of the winding shaft 8 there is located a spring motor which pre-stresses the winding shaft 8 steadily in the direction of a winding-up of the blind material web 12. The winding shaft 8 lies horizontally about underneath the straight outlet slot 7 and parallel to this.

The blind material 12 consists of a smooth perforated plastic foil which is fastened with one edge to the winding shaft 8 and with its other edge 14, parallel thereto, to the pullrod 13.

The two actuating levers 9 and 11 are in mirror image to

7

one another, so that the description for the actuating lever 9 holds analogously also for the actuating lever 11. The actuating lever 9 is a double-armed lever with a lever section 15 as well as a lever section 16. At the transition point between the two lever sections 15 and 16 there is present a bearing bore 17, with the aid of which the actuating lever 9 is swingably borne on a bearing pivot 18. The bearing pivot 18 is fastened to the underside of the broken-away part of the hat deposit area 6 beside the outlet slot 7. The alignment of the bearing pivot 8 is formed in such manner that the lever section 9 moves in a plane which lies about parallel to the plane defined by the windowpane 4.

The actuating lever 9 can be transferred from a position in which the lever section 15 runs about parallel to the winding shaft 8 into a position in which it lies about parallel to the lateral boundary edges of the rear window 3.

In order to move the actuating lever 9 back and forth between these two end positions, the lower lever section 16 is connected to a drive motor 20, over an actuation rod 19. The actuation rod 19 lies parallel to the winding shaft 8 and likewise underneath the hat deposit area 6 together with the drive arrangement 20. The actuating lever 11 is executed in mirror image and is moved synchronously over a corresponding actuation rod in opposite direction to the actuating lever 9.

In the reeled-out state the two lever sections 15 of the actuating levers 9 and 11, as shown, extend upward through the outlet slot 7, while in the reeled-in state they largely

disappear under the hat deposit area 6.

The outlet slot 7 is bounded by two slot edges 22 and 23 which have a spacing from one another such that the two actuating levers 9 and 11 can pass through unimpeded and that also in the actuating levers 9 and 11 the blind material 12 can be drawn out.

With a reeled-in blind the outlet slot 7 is covered by the pullrod 13.

The connection of the actuating lever 9 with the pullrod 13 as well as its profile are to be perceived from Fig. 2.

The profile of the pullrod 13 is composed imaginatively of a relatively narrow strip 25 cylindrically slightly curved upward, and of a downward-leading center piece 26. Its cross-section, therefore, is about T-shaped and it remains unchanged over the length of the pullrod 13. The width of the strip 25 is dimensioned in such manner that with a reeled-in roll-up window blind 5 it covers the outlet slot 23, whereas the center piece 26 plunges downward through the outlet slot 7. The curvature axis of the cover strip 25 lies parallel to the longitudinal extent of the pullrod 13.

The center piece 26 is bounded by two side surfaces 27 and 28, parallel to one another, which stand perpendicularly on the underside of the strip 25.

Proceeding from the side surface 28 there leads into the center piece 26 a groove 29, rectangular in cross section, which extends into the vicinity of the side wall 27. This groove 29 runs through likewise over the entire length of the

pull rod 13 and serves as a guide groove for a head end-piece 31 of the actuating lever 9.

Finally, the center piece contains in its lower side 32 a groove 33 in which the corresponding edge of the blind material 12 is anchored, for example by cementing.

The head end 31 is a multiply bent-off molded part which is inserted with a pivot (not further recognizable) in the tubular actuating lever 9. Proceeding from the free end of the lever 9 the headpiece 31 forms an upward-standing continuation 35, which goes over into a cylindrical pivot 36. The cylindrical pivot 36 extends at a right angle to the longitudinal axis of the lever section 15 and it is laterally offset over a certain distance with respect to the latter.

The pivot 36 lies in the groove 39, whereby there is generated a shiftable coupling between the actuating lever 9 and the pullrod 13.

So that the pivot 36 cannot inadvertently come free from the groove 29 during the actuation of the roll-up window blind 5, there is located at a distance from the groove 29 a downward leading strip 37, which is molded on the underside of the strip 25. Its distance from the side surface 28 corresponds to the thickness of the thickness of the projection 35 measured in this direction.

The actuating lever 11 is guided in the same, but mirror-image manner, likewise in the groove 29.

In case that, by reason of the proportions in the reeled-in state, the actuating levers 9 and 11 were to collide in the

groove 29, it is also possible to use two grooves 29 lying one over the other, in which case each groove is provided for one of the actuating levers.

So that in the traveling in and out the pullrod 13 pressed with pre-stressing against the inner side of the windowpane 4 will not damage the heating wires, it is provided with guide elements 41 in the vicinity of both ends. The guide elements 41 are movably borne and in one position stand over the outer contour of the head strip 25 of the pullrod 13, while in the other position they are drawn back with respect to its outer contour.

In Figs. 3 to 5 there is shown, highly schematically, one of the guide elements 41 together with the appertaining bearing arrangement 42.

The bearing arrangement 42 has two plate-shaped bearing flanges 43, running with spacing parallel to one another, which are fastened to the under side of the cover strip 25; the bearing flange facing the observer is omitted. They point to the windowpane 4. The type of fastening to the cover strip 25, for reasons of clarity, is not represented, especially since this is not of significance for the substance of the invention. What is important to notice is merely that the center piece 26 ends at a sufficient distance from the two bearing flanges 43, in order to create space for their fastening to the cover strip 25.

Because of the type of representation, of the two bearing flanges 43 parallel to one another only one of them is to be

11

perceived. This contains, adjacent to the windowpane 4, a slide-block guide in the form of a guide slot 44 closed along the circumference. The guide slot 44 is composed of a straight, horizontally running branch 45, as well as of a curved downward- leading branch 46. The straight, horizontally running branch 45 points to the windowpane 4 and, at its end adjacent to the windowpane 4, it goes over into the descending branch 46.

The descending branch 46 curves, as the figure makes evident, away from the windowpane 4, so that its lower end 47 is at a greater distance from a vertical plane than the transition zone between the branch 45 and the branch 46.

The guide slot 44 has the same width over its entire length.

With the guide slot 44 there is aligned a congruent guide slot which is contained in the broken-away bearing flange.

In the gap between the two bearing flanges 43 there is arranged the guide element 41. The guide element 41 is a small roller with an essentially cylindrical outer circumferential surface 48 and a coaxially penetrating axle 49. The axle 49 projects at both ends over the roller 41 and it extends with its overhanging ends into the two guide slots 44 aligned with one another. The width of the guide slot 44 corresponds in all places to the diameter of the cylindrical axle 49 which lies about parallel to the lengthwise extent of the pullrod 13.

In a transverse bar 51 extending between the two bearing flanges 43 there is clamped at one end a bending spring 52,

which presses with its free end 53 against the axle 49. The transverse bar 51 is located above the slot 44, so that by reason of the pre-stressing force of the bending spring 52 the axle 49 is prestressed in the direction toward the lower end 47 of the descending branch 46 of the guide channel 44.

Likewise for reasons of clarity the other parts of the roll-up window blind have been omitted from Fig. 3, in order to make evident the essential substance of the bearing arrangement 42 and of the guide element 41.

With additional reference to the representation in Figs. 4 and 5 there is now explained the manner of functioning:

In the reeled-in state according to Fig. 5 the pullrod 13 rests with the edges of its cover strip 25 on the hat deposit area 6. It closes the outlet slot 7, which it overhangs with the cover strip 25. In this state the actuating levers 9 and 11 are withdrawn under the hat deposit area 6 (not represented in Figs. 4 and 5) and, furthermore, the blind material 12 is completely wound up on the winding shaft 8.

In the reeled-in state, by reason of the relative proportions of the thickness of the hat deposit area 6 as well as the spatial position of the guide slot 44, the roller 41 lies with its outer circumferential surface 28 against the edge 22 of the outlet slot 7. Its axle 49 is located there in the farthest remotely lying end of the horizontally running branch 45 of the guide slot 44.

The bending spring 52, which is supported on the circumferential surface of the axle 49, presses the guide

roller 51 against the slot edge 22.

In order, proceeding from this position, to draw out the roll-up window blind 5, the motor drive arrangement 20 is set in operation, whereby the actuating levers 9, 11 are increasingly raised out of their position parallel to the winding shaft 8. Hereby they move the pullrod 13 upward and draw the blind material 12 correspondingly out of the outlet slot 7. In the course of the drawing-out the guide roller 41 moves to a position above the outlet slot 7, so that it is no longer pressed back from the slot edge 22 against the action of the bending spring 52. The bending spring 52, therefore, moves the axle 49 into the position according to Fig. 4, i.e. first into the transition zone between the two branches 45 and 46 of the guide slot 44.

As soon as the guide roller 41 with its circumferential surface 48 has become completely free from the slot edge 22, the bending spring 52--by reason of its anchoring point which, as mentioned above, lies above the guide slot 44--will move the axle 49 also downward in the direction to the lower end 47 of the vertical branch 46 of the guide channel 44.

After about 50 to 90% of the maximally possible travel-out stroke, the guide roller 41, as Fig. 3 shows, will come in contact with the inner side of the windowpane 4. Since it overhangs the outer contour of the cover strip 25, it prevents a contact between the windowpane 4 and the cover strip 25.

By reason of the slope between the windowpane 4 and the movement path of the two actuating levers 9 and 11, the force

with which the guide roller 41 is pressed into the window pane 4 becomes increasingly greater. Since this force develops exclusively an obliquely downward-directed component on the axle 49, this axle 49 is increasingly pressed against the end 47 of the guide channel 44. This is achieved essentially by the away-yielding course of the lower branch 46 of the guide channel 44.

The bending spring 52 does not need to absorb any force component which derives from the pressing-on force of the guide roller 41 against the windowpane 4.

As soon as the guide roller 41 comes in contact with the windowpane 4, it begins to turn with, or on, its axle 49. Thereby there arises on the inside of the windowpane 4 exclusively a rolling movement and no sliding movement.

In the reeling-in, the process begins in Fig. 3, and shortly before the complete reeling-in, the state according to Fig. 4 is reached. The contact between the outer circumferential surface 48 of the guide roller 51 and the upper edge of the slot flange 23 generates an upward-directed force which is opposed to the force of the bending spring 52, but is greater. The axle 49, therefore, despite the action of the spring 52, is raised and passes into the transition zone between the two branches 45 and 46 of the guide slot 44. The further downward movement then presses the axle 49 against the force of the bending spring 52, back into the horizontal branch 45.

It is obvious that the above-explained processes in the

two guide elements 41 take place beside the ends of the pullrod 13.

The new arrangement requires no recesses in the outlet slot in order to make possible the passage-through of the guide elements 41.

In deviation from the embodiment shown, it is also possible to take, instead of for example a wire-form bending spring 52, a leaf spring which is forked at its end adjacent to the axle 49, so that also the axle 49, beside the two face sides of the guide roller 41, exerts a force on the axle 49.

Fig. 6 shows an embodiment in which, instead of the guide roller 41, a guide skid 41 is used. The guide slot 44 has a constant curvature over its length and everywhere the same slot width. Its position is as represented in the figure, or as it results from the functional description given below.

The guide skid 41 has the form of a circular sector of more than 180°, and it consists of friction-poor material, for example PTFE. The guide skid 41 is a plane-parallel plate that fits between the two bearing flanges 43 and which is provided in the vicinity of its straight edge with two guide pins 55 which are aligned with one another. Each guide pin 55 has an about reniform shape, and, namely, the pin has the same curvature as the guide channel 44 and is merely somewhat shorter in the peripheral direction. Here the guide skid 41 is prevented from tilting. The only movement that it can execute is a movement along the circular arc that is given by the guide channel 44.

The reeled-out state is illustrated in Fig. 6 with continuous lines and one perceives how the guide skid 41 with its circumferential surface overhangs the edge of the cover strip 25. Otherwise the movement occurs about an axis which again lies parallel to the lengthwise extent of the cover strip 25 or of the pullrod 13.

In the reeling-in the guide skid 41 similarly as the guide roller 41 is pressed upward from the slot edge 22 into the position shown in broken lines in Fig. 6. There the bending spring 52 is more strongly bent.

Conversely, the bending spring 52 presses the guide skid 41 into the position drawn in solid lines according to Fig. 6 as soon as, in the traveling-out of the roll-up window blind, it has come free from the outlet slot 7.

In the two embodiments explained before, the yielding movement of the guide elements 41 occurs about an axis that is aligned parallel to the longitudinal extent of the pullrod 13. Figs. 7 to 9, in which the retreat movement occurs with respect to an axis which stands perpendicular on the longitudinal axis of the pullrod 13.

Also Figs. 7 to 9 are much schematized and show merely the parts required for the bearing of the guide element 41 in a simplified form.

On a holding flange 61 leading downward from the cover strip 25,a bearing carrier 62 is swingably borne. The bearing carrier 62 carries an upward extending bearing pin 63 which is turnably borne in a bearing bore (not shown) of the holding

flange 61. The axis of rotation runs vertically and at a right angle to the longitudinal axis of the pullrod 13. On the free end facing the window pane 4, of the bearing carrier 62, the guide roller 41 is turnably borne. By means of a winding spring 64, the bearing carrier 62 is pre-stressed in the end position in which the guide roller 41 overhangs the outer contour of the cover strip 25. In this position, the axis of rotation of the guide roller 41 runs parallel to the section of the ordinarily curved windowpane 4 on which the guide roller 41 lies. In this manner, the force active between the guide roller 41 and the windowpane 4 generates no torque with respect to the bearing pin 63.

Underneath the axis of the guide roller 41 the bearing part carries a control lever 66. This control lever 66 cooperates with an oblique surface 67 which is formed on the slot edge 22. The oblique surface 67 provides that in the plunging of the control lever 66 the contact between the actuating lever 66 and the oblique surface 67 swings the bearing carrier around about the axis defined by the bearing pin 63, so that the roller 41 is folded back in the desired manner with respect to the outer contour of the cover strip 25 in order to fit into the outlet slot 7.

Otherwise, the function and manner of functioning is similar to that described above.

A roll-up window blind for automobile rear windows has two actuating levers, with which the pullrod is moved in the direction of a reeling-out or reeling-in of the rouleau web.

The levers are borne in such manner that in the reeled-out state the pullrod is pressed with a pre-stressing force against the rear window pane. In order to avoid a damaging of the heating wires, the pull rod is provided on end side with guide elements which are movably mounted on the pullrod. With a reeled-out blind they project beyond the outer contour of the pullrod and, while they themselves lie against the rear windowpane, they hold the pull rod at a distance from the rear windowpane. In the reeling-in they are drawn back behind the outer contour of the pullrod, so that they can be withdrawn into the slot from which the blind material emerges, and, namely, without recesses being necessary on the slit edges for the guide elements.